REGULATION 6.38 Standard of Performance for Existing Air Oxidation Processes in Synthetic Organic Chemical Manufacturing Industries

Air Pollution Control District of Jefferson County
Jefferson County, Kentucky

Relates To: KRS Chapter 77 Air Pollution Control
Pursuant To: KRS Chapter 77 Air Pollution Control
Necessity And Function: KRS 77.180 provides that the Air Pollution Control Board may make and enforce all needful orders, rules, and regulations necessary or proper to accomplish the purposes of KRS Chapter 77. This regulation provides for the control of volatile organic compound emissions from air oxidation processes in the synthetic organic chemical manufacturing industry.

SECTION 1 Applicability

This regulation applies to each air oxidation process reactor and associated product recovery system for sources within the synthetic organic chemical manufacturing industry (SOCMI) which was in being or had a construction permit issued by the District before the effective date of this regulation.

SECTION 2 Definitions

Terms used in this regulation not defined herein shall have the meaning given them in Regulation 1.02.

2.1 "Air oxidation facility" means any product recovery system and all reactors in which air is used as an oxidizing agent to produce an organic chemical.

2.2 "Product recovery system" means any equipment used to collect volatile organic compounds for beneficial use, reuse, sale or recycling (such as absorbers, adsorbers, condensers, and ammonia or hydrochloric acid recovery units), which discharge directly into the atmosphere or discharge back to the recovery system.

2.3 "Total Resource Effectiveness index value" (TRE) means the measure of the supplemental total resource requirement per unit VOC reduction associated with VOC control by thermal oxidation as calculated using the formula and coefficients presented in Table 1.

SECTION 3 Standard for Volatile Organic Compounds

The owner or operator of each air oxidation process vent stream shall either use a combustion device which reduces total organic compound emissions (minus methane and ethane) by 98% by weight or to 20 ppm by volume (ppmv), whichever is less stringent, or maintain a TRE index value greater than 1.0.

SECTION 4 Compliance Timetable

The owner or operator of an affected facility shall be required to complete the following:

4.1 Submit a final control plan for achieving compliance by March 1, 1987;

4.2 Award the control system contract by May 1, 1987;

4.3 Initiate on-site construction or installation of emission control equipment by June 1, 1987;

4.4 Complete on-site construction or installation of emission control equipment by November 30, 1987; and

4.5 Demonstrate final compliance by December 31, l987.

SECTION 5 Exemption

An air oxidation facility which uses a combustion device for control of VOCs as of the effective date of this regulation is exempt from Section 3 until the combustion device is replaced or upgraded.

Adopted v1/12-17-86; effective 12-17-86.

Table 1 To Regulation 6.38

TRE

The Total Resource Effectiveness index value is calculated using the following equation:

$$TRE = \frac{a + b*Flow^{0.88} + c*Flow + d*Flow*H_T + e(Flow*H_T)^{0.88} + f*Flow^{0.5}}{H.E.}$$

where:

TRE	=	Total Resource Effectiveness index value.
H.E.	=	Hourly emissions reported in kg/hr measured at full operating flowrate *.
Flow	=	Vent stream flowrate (scm/min) at a standard temperature of 20 ^{o}C.*,**.
H_T	=	Vent stream net heating value (MJ/scm), where the net enthalpy per mole of offgas is based on combustion at 25 ^{o}C and 760 mm Hg, but the standard temperature for determining the volume corresponding to one mole is 20 ^{o}C, as in the definition of Flow.

a, b, c, d, e, and f are coefficients. The set of coefficients which apply to a process vent stream can be obtained from Table 2.

*Use EPA Publication 450/3-84-015 Appendix H for reference methods and procedures.
**For a Category E stream, the last term of the equation is modified to:

$$\frac{f\ (Flow\ *\ H_T)^{0.5}}{3.6}$$

TABLE 2 to REGULATION 6.38

Coefficients of the Total Resource-Effectiveness (TRE) Index Equation

A1. For Chlorinated Process Vent Streams, If 0 ≤ Net Heating Value (MJ/scm) ≤ 3.5:
W = Vent Stream flowrate

(scm/min)	a	b	c	d	e	f
W < 13.5	48.73	0	0.404	-0.1632	0	0
13.5 < W ≤ 700	42.35	0.624	0.404	-0.1632	0	0.0245
700 < W ≤ 1400	84.38	0.678	0.404	-0.1632	0	0.0346
1400 < W ≤ 2100	126.41	0.712	0.404	-0.1632	0	0.0424
2100 < W ≤ 2800	168.44	0.747	0.404	-0.1632	0	0.0490
2800 < W ≤ 3500	210.47	0.758	0.404	-0.1632	0	0.0548

A2. For Chlorinated Process Vent Streams, If 3.5 < Net Heating Value (MJ/scm):
W = Vent Stream flowrate

(scm/min)	a	b	c	d	e	f
W < 13.5	47.76	0	-0.292	0	0	0
13.5 < W ≤ 700	41.58	0.605	-0.292	0	0	0.0245
700 < W ≤ 1400	82.84	0.658	-0.292	0	0	0.0346
1400 < W ≤ 2100	123.10	0.691	-0.292	0	0	0.0424
2100 < W ≤ 2800	165.36	0.715	-0.292	0	0	0.0490
2800 < W ≤ 3500	206.62	0.734	-0.292	0	0	0.0548

B. For Nonchlorinated Process Vent Streams, If 0 ≤ Net Heating Value (MJ/scm) ≤ 0.48:
W = Vent Stream flowrate

(scm/min)	a	b	c	d	e	f
W < 13.5	19.05	0	0.113	-0.214	0	0
13.5 < W ≤ 1350	16.61	0.239	0.113	-0.214	0	0.0245
1350 < W ≤ 2700	32.91	0.260	0.113	-0.214	0	0.0346
2700 < W ≤ 4050	49.21	0.273	0.113	-0.214	0	0.0424

C. For Nonchlorinated Process Vent Streams, If 0.48 < Net Heating Value (MJ/scm) ≤ 1.0:
W = Vent Stream flowrate

(scm/min)	a	b	c	d	e	f
W < 13.5	19.74	0	0.400	-0.202	0	0
13.5 < W ≤ 1350	18.30	0.138	0.400	-0.202	0	0.0245
1350 < W ≤ 2700	36.28	0.150	0.400	-0.202	0	0.0346
2700 < W ≤ 4050	54.26	0.158	0.400	-0.202	0	0.0424

D. For Nonchlorinated Process Vent Streams, If 1.9 < Net Heating Value (MJ/scm) ≤ 3.6:
W = Vent Stream flowrate

(scm/min)	a	b	c	d	e	f
W < 13.5	15.24	0	0.033	0	0	0
13.5 < W ≤ 1190	13.63	0.157	0.033	0	0	0.0245
1190 < W ≤ 2380	26.95	0.171	0.033	0	0	0.0346
2380 < W ≤ 3570	40.27	0.179	0.033	0	0	0.0424

E. For Nonchlorinated Process Vent Streams, If 3.6 < Net Heating Value (MJ/scm):
W = Vent Stream flowrate

(scm/min)	a	b	c	d	e	f
W < 13.5	15.24	0	0	0.0090	0	0
13.5 < W ≤ 1190	16.63	0	0	0.0090	0.0503	0.0245
1190 < W ≤ 2380	26.95	0	0	0.0090	0.0546	0.0346
2380 < W ≤ 3570	40.27	0	0	0.0090	0.0573	0.0424